

REMARKS/ARGUMENTS

Drawings

The Examiner's objection with regard to the drawings, in particular Fig. 9, does not really concern the drawing, but rather the text of the specification where on page 3, line 6, the reference character "32" should have read "33". This has now been corrected.

Claim Rejections - 35 USC § 102

The Examiner has rejected claims 1-18 as anticipated under 35 U.S.C. 102(a) by Bloom U.S. Patent No. 5,931,983.

In order to more clearly define the present invention over Bloom, claim 1 has been amended to make it clear that "elongating the fused fibers" in step (c) is done as a separate step from "fusing said fibers" in step (b). This is clearly supported by the disclosure, for example as set out on page 14, lines 18-19.

Moreover, it has been further indicated in step (c) that the elongation process is stopped when a match point between wavelength period and polarization phase is achieved so as to obtain simultaneously a predetermined wavelength spacing and a required polarization phase match. This is clearly supported by the specification, for instance on page 3, lines 16-17.

It is respectfully submitted that claim 1, particularly as now amended, is not anticipated by Bloom under 35 U.S.C. § 102. As indicated in MPEP 706.02, in order to anticipate under 35 U.S.C. § 102, the applied reference must teach every aspect of the claimed invention either explicitly or implicitly. This is clearly not the case herein.

Thus, claim 1 teaches in step (b) the fusing of the fibers in a fusing zone, using a suitable heat source to achieve a **predetermined fusion profile**. This fusion step which is distinct and separate from the heating and elongation step is completely absent in Bloom who does not give any recognition to the importance of achieving a predetermined fusion profile. On the contrary, the fusing step and the degree and influence of fusion are very important within the present invention as described throughout the specification (e.g. p. 9, lines 19-24; p. 11, line 21 to p. 12,

line 3; p. 14, lines 1-10; p. 14 lines 18-21; p. 22, lines 4-19 and Fig. 2; p. 30, lines 10-17, etc.). In fact, on p. 30, lines 14-16 it is stated that "Because the fiber is not tapered during the fusion step, one can measure the width of the fused region by looking at the two optical fibers from an axis orthogonal to the fiber plane. As illustrated in Fig. 2, the width is proportional to the degree of fusion.". No such separate fusion control is either disclosed or even hinted at in Bloom.

Furthermore, Bloom does not disclose the stopping of the elongation process when a match point between wavelength period and polarization phase is achieved so as to obtain simultaneously a predetermined wavelength spacing and a required polarization phase match, as now clearly indicated in step (c) of applicant's claim 1. In fact, Bloom does not teach at all how to manufacture a wavelength selective coupler where the wavelength period and the phase of the polarization modes are matched to produce a wavelength multiplexer or demultiplexer with a desired polarization dependence. Bloom merely describes monitoring the coupler at two different wavelengths to create a wavelength multiplexer. Bloom, however, does not teach how the geometrical longitudinal profile and the fusion profile of the coupler influence the wavelength dependence of the coupler or how to change these profiles to adjust the wavelength dependence and create the phase matching of the polarization response at the desired wavelengths, as is disclosed and claimed by the present applicant. It is, therefore, submitted that Bloom does not anticipate claim 1 as amended, under 35 U.S.C. 102(a).

Regarding claims 2 to 5, they deal with achieving a precise polarization phase match point between the wavelength period and the polarization phase. Bloom discloses nothing of the sort, as he deals merely with controlling the coupling ratio in a coupler for a selected wavelength (c.f. column 2, lines 33 to 47). Thus, Bloom clearly does not anticipate these claims.

Regarding claims 6 to 12, they deal with the distinct and separate step of fusing the fibers in accordance with the present invention as defined in step (b) of claim 1. No such step is disclosed by Bloom.

Regarding claim 13, it deals with the specific manner of heating and elongating the fibers in step (c) of claim 1 to obtain the simultaneous predetermined wavelength spacing and polarization phase match which are not disclosed by Bloom.

Claims 14 to 16 disclose the type of single mode fibers that can be used in conjunction

with the method of claim 1 and Bloom does not disclose all such combinations of fibers.

Claims 17 and 18 depend on claim 1 and comprise the novelty and patentability of the latter.

Finally, claim 19 defines a multiplexing or demultiplexing single mode fiber optic coupler having a narrow channel spacing of a minimum of $0.4\mu\text{m}$, produced in accordance with claim 1. It is submitted that such coupler is not anticipated by Bloom or the other references cited by the Examiner. Bloom specifically deals with wideband couplers (c.f. the abstract penultimate line and column 4, line 12) and claim 19 deals with a narrow channel or narrow band coupler which is a hundred times more wavelength selective than the coupler described by Bloom. None of the other patents cited by the Examiner disclose or suggest such multiplexing or demultiplexing narrow band coupler as set out in claim 19.

Concerning process limitations of the coupler claimed in claim 19, they are believed to clearly distinguish this narrow band coupler from those of the cited prior art. Such process limitations are common as, for example, evident from the following recently issued patents (see enclosures).

U.S. Pat. No. 6,626,975 (c.f. claim 10)

U.S. Pat. No. 6,631,626 (c.f. claim 18)

U.S. Pat. No. 6,638,367 (c.f. claim 2)

U.S. Pat. No. 6,586,327 (c.f. claim 26)

It is, therefore, submitted that claim 19 is proper and not anticipated under 35 USC § 102.

Claims Rejections - 35 USC § 103

In addition to the rejections under 35 USC 102(a) the Examiner has rejected the same claims under 55 U.S.C. 103(a), as obvious over Bloom, U.S. Patent No. 5,931,983 and for claim 19, under Bloom or other cited U.S. Patents, namely Gonthier et al. U.S. Patent No. 5,796,885, Tremblay et al. U.S. Patent No. 4,586,784, Kawasaki et al. U.S. Patent No. 4,763,977, Hill et al. U.S. Patent No. 5,054,874 or Brichenno et al. GB Patent No. 2,220,765.

This rejection is also respectfully traversed for the following reasons.

According to MPEP 2143, the basic requirement of a *prima facie* case of obviousness is that "...the prior art reference (or references when combined) must teach or suggest all the claim

limitations". Furthermore, according to MPEP 2143.01, the prior art must suggest the desirability of the claimed invention.

It is respectfully submitted that neither Bloom nor the other references cited with regard to claim 19 have met either of the above conditions.

There is no suggestion in Bloom that a separate fusion step should be used to achieve a predetermined fusion profile and that thereafter the pulling and heating be stopped (after achieving a desired coupling with an adiabatic profile) when a match point between wavelength period and polarization phase is achieved so as to obtain simultaneously a predetermined wavelength spacing and a required polarization phase match. In fact, Bloom does not teach or suggest how to manufacture a wavelength selective coupler where the wavelength period and the phase of the polarization modes are matched to produce a wavelength multiplexer or demultiplexer with a desired polarization dependence, as is the case of the applicant's invention. And certainly, there is no suggestion in Bloom of a desirability of achieving the claimed features of the present invention as explained above.

Regarding claim 19, neither Bloom nor the other references cited by the Examiner against this claim provide any suggestion of obtaining a multiplexing or demultiplexing single mode fiber optic coupler having a narrow channel spacing, as produced in accordance with claim 1.

It is, therefore, submitted that none of the present claims are either anticipated or obvious in view of the prior art cited by the Examiner.

As the Examiner is aware, this application is the national phase of International Application No. PCT/CA00/01314 where the international search had revealed the existence of WO 98 13711 A of Bloom which includes the subject matter of the cited U.S. Patent No. 5,931,983. This Bloom reference was, however, cited under the category "A" defined as "document defining the general state of the art which is not considered of particular relevance". A copy of the International Search Report is enclosed for the Examiner's information as Appendix 2. This is a further indication that the Bloom reference is of no particular relevance to the invention claimed by the present applicant.

Accordingly, in view of the foregoing amendments and remarks, it is respectfully submitted that the present application is now in condition for allowance and an early favorable action is earnestly solicited.

The Examiner is invited to call Applicant's agent if any questions remain following review of this response.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read 'Primak', with a horizontal line underneath.

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